THE POLAR TIMES

AMERICAN POLAR SOCIETY

Secretary's Letter

We decided to experiment with color for this issue. Much of the photography and art that we receive is in color, and some is so beautiful that it seems a sin to convert it to black and white. In addition, in order to portray the true majesty of the Arctic and the Antarctic, we have to go to full color. Your comments on the decision are most welcome.

A second American Polar Society Symposium is in the works. The National Snow and Ice Data Center of the University of Colorado, Boulder, has agreed to serve as host. At present we do not have a firm date but expect that it will be held in October 2000. We will advise the membership just as soon as the date has been nailed down.

Note that we have expanded coverage of the polar regions to include a sub-set of photographs of Europa, one of Jupiter's moons (see p. 19). Europa is an ice-covered planet and is truly a polar world. This raises the question of what are the limits to coverage in *The Polar Times*. I receive articles about lands that truly have a polar climate that are not in the Arctic or the Antarctic—Himalayan ice fields, Andes glaciers and south Alaskan ice streams for instance. In the past I have diligently rejected the articles, but other members have suggested that I reconsider. Please send in your comments.

Again, I want to thank all of you who have taken the time to clip and mail in articles as well as those who send them by email. Without your help the *Polar Times* would founder. Keep up the good work. ❑

Sincerely,

Brian Shoemaker

Editor's Letter

Well, here it is! An historic moment—we've gone color. Technology and our budget has come close enough to give it a try. We need material for future articles. Please send us your color photography and stories for publication.

Your comments are most welcome!

Della Weston

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OUR COVER

The original Polar Times, *published in the spring of 1935, featured the polar bear and the penguin—symbols in black and white of the Arctic and Antarctic. In 1993, Della Weston, our editor, used this cover to design the society logo. Shortly afterward, membership pins were struck and were well received. It only seemed fitting that if we were to depart from tradition and begin publishing in color, that we start with the 1935 cover. Anne Matthews of South Coast Printing scanned the old cover into her computer and painted in this issue's rendition. We hope that you like it!* ❑

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BRIAN SHOEMAKER, Secretary
P.O. Box 591, North Bend, OR 97459
Ph 541-756-9013 • Email:apolars@presys.com
Website: www.geocities.com/~oaedks/amerpolr.html

DELLA WESTON, Editor

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Membership dues are $15 a year ($17, foreign), and entitle members to receive the *Polar Times* twice a year. The American Polar Society is classified as a tax exempt organization under Sec 501(C)3 of the IRS Code.

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About Your Annual Dues

The Board of Governors has examined the dues structure of the Society and has changed the dues for 2000 as follows:

Annual Dues Rate $15.00; Foreign $17.00
Library Dues Rate $20.00; Foreign $22.00
Annual Corporate Rate $100.00
Life Membership $200.00; Foreign $220.00

For ease of administration we ask for annual dues to be submitted at the end of each calendar year, and we include a remittance envelope with the Fall/Winter issue of the *Polar Times*.

Since many of you send in your dues several years in advance, we tag your contributions to our membership files in our computer. This tag prints out on your membership sticker that we place on the envelope for the *Polar Times*. If it reads "expires 1299," then your membership contribution was due on January1, 2000. If it reads "expires 1298," you are two years in arrears! If in doubt, send in your contributions, and we will credit your account by advancing your expiration date. We will honor all dues paid in advance at the old rate, but upon expiration the new rates apply.

Multiple year contributions are welcome as are donations. We are a tax exempt organization as defined by Sec 501(C)3 of the IRS Code. ❑

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American Polar Society • Fall-Winter 1999

Top Secret Satellite Photos of Antarctica Released

WASHINGTON, 15 September 1999— At the direction of President Clinton classified high resolution photos of Antarctica have been released. (See "Clinton," p. 16.) The images were released for public use on 15 September 1999 under a cooperative project of the National Science Foundation, the National Imagery and Mapping Agency, and the DCI Environmental Center. The first of these images is of the McMurdo Dry Valleys, one of the few areas of Antarctica where the geology is exposed and where unique microscopic organisms have evolved prompting this area to be selected as one of the Long Term Ecological Research (LTER) project sites.

Photo Provided by NSF

McMurdo Dry Valleys, Antarctica, 5 December 1975

The LTER Program, which consists of a network of 21 ecosystem research sites extending from Alaska to the continental United States to Puerto Rico to Antarctica. The LTER sites represent a variety of ecosystems, including grassland, desert, forest, tundra, lake, stream, river, agricultural, coastal systems, and urban systems. Two LTER sites are located in Antarctica, one in the Antarctic Peninsula marine ecosystem, near USAP's Palmer Station; and the other in the Dry Valleys, near McMurdo Station.

The Dry Valleys are ecologically significant because they are a region where life approaches its environmental limits and they stand in stark contrast to most of the world's other ecosystems, which exist under far more moderate environmental conditions.

Recognizing the unique contribution that U.S. photo reconnaissance systems could make to the environmental understanding gained through this research, the Director of the National Imagery and Mapping Agency, Lieutenant General James C. King, has approved the release of this image product created from still-classified imagery. The image product is an important data source to further scientific research and to enhance understanding of life in this extreme environment. The data, collected by the classified system in 1975 and 1980, provide the earliest available high-resolution regional coverage of the McMurdo Dry Valleys. These imagery products have a nominal spatial resolution of 8 meters, 10 times better than Landsat imagery available in the 1970s, and thus provide important research opportunities. First, as the earliest available images of the region, NSF-supported scientists will be able to analyze hydrologic changes, which influence the presence and stability of life forms. Photographic data collected in the 1980s (Landsat and Radarsat data) and more recent photography form the basis for comparison. Second, the newly released products are in stereo. Five images of this region obtained on 5 December 1975 and two images obtained on 22 September 1980, will be available, as will elevation data derived from the stereo pairs of the 1975 images. A boon to scientific research. ❑ ***(cb Billy-Ace Baker)***

Tourist Impact on Gentoo Penguins Less Than Expected

***Antarctic*, New Zealand Antarctic Society, Vol. 17, No. 1, August 1999, p. 20**—It appears that penguins, or specifically the Gentoo penguins on the Antarctic Peninsula, don't mind the odd thousand or two well behaved visitors arriving at their Antarctic home.

Scientists' fears that tourism has been adversely affecting the Gentoo penguin population at Port Lockroy have been quelled after a study showed that their breeding habits have remained the same as other penguin colonies untouched by tourists.

Port Lockroy, located on the Antarctic Peninsula, is one of the most popular destinations for tourists visiting Antarctica by cruise ships and yachts.

The site is a natural harbor with spectacular mountain scenery and abundant wildlife.

Tourists have been visiting Port Lockroy regularly since the 1980s, although only since 1996 have they been able to visit the restored old British base on Gaudier Island.

Norman D. Cobley, John R. Shears and Rod R. Downie reported at the 1998 VII SCAR International Biology Symposium in Christchurch that the British Antarctic Survey (BAS) were concerned that the large number of tourists visiting Port Lockroy might be having adverse effects on the wildlife, particularly the Gentoo penguin (*pygoscelis papua*) and began an environmental monitoring program in 1996 to determine human impact.

In order to investigate the effects of visitors on Gentoo penguin population trends and reproductive performance, a team used a combination of long-term (40 years) count data obtained from Alice Creek and Damoy as well as two years of intensive studies of breeding performance at Gaudier Island. At the Alice Creek and Damoy Point colonies, which are 700m apart and of a similar size, the number of breeding pairs has increased between 1958 and 1998, and there is a strong positive correlation between the sizes of the two colonies.

However, the two colonies have received markedly different numbers of visitors since 1989. Alice Creek has been visited by about 2,500 people annually. The Alice Creek colony is split into two groups by an isthmus. Jougla Point occupies the low ground and is near to the main landing area used by visitors, while at Lecuyer Point, the colony occupies higher ground and is further away from the visitor landing beaches.

Most tourists remain at the colonies around the landing areas. Monitoring has shown that in both areas the colonies have increased at similar rates.

On Gaudier Island, Gentoo penguins colonized the island in 1985, and their population has been expanding. The breeding performance in 1996-97 was compared in treatment colonies, where visitors were free to approach the colonies, following Antarctic Treaty guidelines (minimum approach 5m) and at control colonies where visitors were excluded.

There were no differences in key breeding performance parameters (pairs-laying, clutch size, brood size, breeding experience, chick mass and survival to 20 days old) that could be related to visitor disturbance, says the BAS team.

In the 1996-97 and 1997-98 seasons, over 3,000 visitors came to Gaudier Island, but the breeding population of Gentoo penguins and their overall breeding success (chicks fledged per pair) was high and comparable to an [undisturbed] Antarctic peninsula Gentoo penguin colony.

The BAS team concluded that while Gentoo penguin populations have changed at Port Lockroy since the 1950s, there is no evidence that current tourist numbers have adversely affected the population. ❑ ***(cb Peter Barretta)***

Cape Roberts Project Is 'Go' For Third Season

***Antarctic*, New Zealand Antarctic Society, Vol. 17, No. 1, p.5, August 1999**—The third season of the ambitious international Cape Roberts deep-sea drilling project is under way after all participating nations were advised that sufficient depth of ice has built up to allow a return.

Earlier a massive storm had made the drilling location dangerous, and project planners delayed their decision on a third season until August.

The storm had caused considerable ice breakout for 20km along the edge of the ice shelf, leaving the previous drilling site a tenuous 5km from safety.

Satellite images of the area have been closely studied this winter, and there were hopes that the conditions between June-August would become cold enough to allow sea ice to form up to the minimum operating thickness of 1.5m.

Project manager Jim Cowie of Antarctica New Zealand told *Antarctica* that a teleconference between representatives of the consortia (Britain, United States, Italy, Australia and New Zealand) discussed the conditions on 10 August and agreed to proceed via "Winfly" in mid-August.

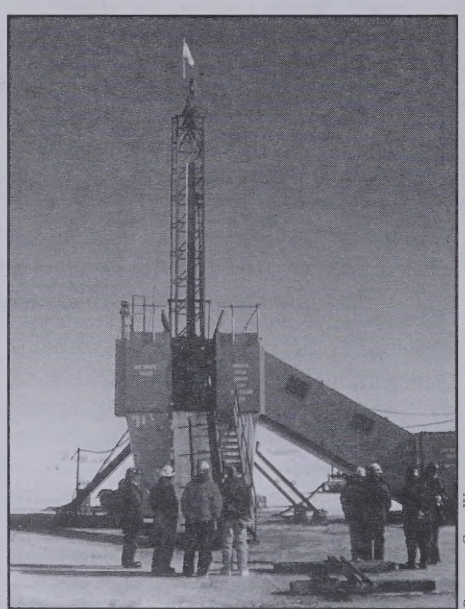


PHOTO BY GARY WILSON

"Temperatures in July were about 3 to 4 degrees above average mean but there has been reasonable growth in the ice, with a new ice edge formed, and there are hopes that it is thick enough in the area chosen for the next drill site," he says. The ice shelf currently extends some 22km offshore.

The area south of the site is believed to be "a good deal thinner and younger."

On arrival, an advance party will check the "ground truth" of the situation. The project has always been based on an assumption that weather patterns may force postponement at any time.

After a ground inspection, the party will prepare at Scott Base for the main contingents, and in early September will start assembly of the drilling platform on a location 600-700m out on the ice from Cape Roberts. The new location is closer to land than the two previous sites at 14km offshore and aims to pick up new layers.

The target is to achieve 700m of core sample (624m last year) in one season, for Cowie says the water depth on the new site is much deeper at 320m and technically more difficult.

The project aims to study the record of earlier glacial movements as a way of understanding ancient climate changes and tectonic structures. It attracted huge international attention when the team found evidence of volcanic eruptions 25 million years ago that were as big as Krakatoa in Indonesia and which would have affected global climate. ❑ ***(cb Peter Barretta)***

Polar Bear Shreds Kayak

***New York Times* "International", 25 August 1999, p. A7, OSLO (AP)**—Two Norwegian adventurers spent 12 days stranded on an Arctic island because a hungry polar bear destroyed their kayaks.

The men, Jens Abild and Simen Havig-Gjelseth, set off in mid-June on a 700-mile trek around Spitsbergen, the main island of the Svalbard archipelago, the newspaper Nordlys reported today.

After almost two months of paddling through the icy waters, they had less than 190 miles to go no Aug. 9 when, as they were unloading supplies into a borrowed cabin, a huge polar bear caught scent of the dried food in their kayaks. The bear ripped the boats into pieces to get at the food.

Luckily the men had food and other supplies in the cabin, 125 miles from the nearest settlement, and on Saturday a Norwegian Coast Guard helicopter spotted the two men and arranged their rescue.

Both are in good condition, the newspaper said. ❑ *(cb Abel Shafer)*

ASSOCIATED PRESS PHOTO

A polar bear roams on the Svalbard archipelago between Norway's northern tip and the North Pole.

German Researchers Land on Floes

***Antarctica*, New Zealand Antarctic Society, Vol. 17, No. 1, August 1999, p. 199**—German polar researchers have landed on ice floes in the Antarctic by helicopter for the first time in order to identify them using satellite transmitters.

These devices will enable the researchers to track the ice floes for a year to gain more information about marine currents and iceberg drift, report "Deutschland."

The scientists were set down on the 40m-high soccer-field-sized "table icebergs" in the Antarctic by the helicopter based on the *Polarstern* research ship.

The transmitters, carefully packaged in waterproof material, were buried in the snow. The project is part of an international research program and involves participation by 43 scientists from four countries. ❑ *cb Peter Barretta)*

Into The Light...

...a story of WINFLY

By Matt Thompson—The sun rises slowly on the horizon, its light bringing forth a forgotten energy. The feelings that come with the sunlight inspire reflection on the darkness of the past months. Throughout the long night, the darkness is accepted as a blanket that shuts out the light and warmth of the rest of the world. As the light returns, the surrounding world is revealed. The mountains, glaciers and sky have been there all along, but are seen again as if for the first time. Each day the light stays a little longer and its power is revitalizing. Thoughts of the world beyond — the green hills of New Zealand — come to mind. Planes will soon be flying in and the winter season will end. The wait for the sun's return is over, the winter journey almost complete.

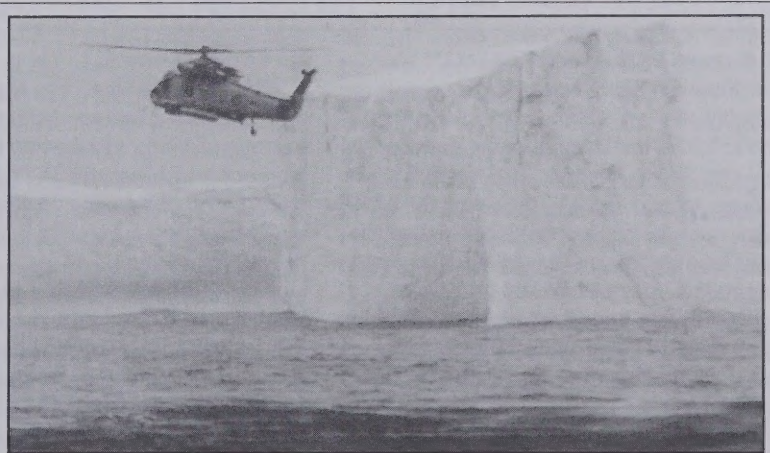
Planes arriving at WINFLY in the end of August bring new faces. Feelings about these people are mixed — the energy they bring is like a breath of fresh air, but they also disrupt the normal winter routine. But these planes also bring mail and fresh food, something that in a sense seems foreign. The community starts to stir more and more, as if it is being brought out of a long slumber. It takes a while to adjust to the changes, but slowly the new people are accepted into the winter world. The feeling of being on a downhill slide is common in the remaining days of winter, during the wait for Mainbody flights in October.

Then, before you realize the end is near, it is here — the long awaited day when you get to leave. As you settle into your seat on the plane, your thoughts are filled with green trees, singing birds, the smell of fresh flowers, and the anticipation of a bubble bath followed by a meal at a small café. Your journey now complete, the plane departs this beautiful and forbidding land, and takes you into the light. ❑

Matt Thompson wintered-over at McMurdo in 1999

Poaching Patrol

A Kaman-built SH2F Seasprite helicopter—the first of four sold to the Royal New Zealand Navy (RNZN)—is shown patrolling for fish poachers in the Ross Sea off Antarctica. The aircraft, which replaced the RNZN's Westland Wasp, deploys on board the ANZAC-class frigate *HMNZS Te Kaha*. The aircraft, long used aboard U.S. Navy Frigates and Destroyers gives a broad area search capability to the ship and extends its ability to board poachers and, if necessary, disable them. (See "Piracy in the Cold Seas," *Polar Times*, Vol. 2, No. 13, p. 6.)—*Edited and reproduced courtesy of* Sea Power *magazine.*



KAMAN AEROSPACE

Huge Polar Wave Circles Antarctica

23 Aug 1999, by Michael Byrnes (Reuters), SYDNEY—It sounds like an Aussie surfer's dream—an endless wave as high as a mountain.

Scientists in Australia have found exactly such a wave circling Antarctica. They say it is so large, it could hold the key to deluge and drought in much of the Southern Hemisphere.

As big as the entire Australian continent and a kilometer (0.6 of a mile) deep, the wave endlessly circles Antarctica and takes eight to nine years to complete a rotation.

The scientists say the "Antarctic Circumpolar Wave," most of which moves under the ocean's surface, affects the weather in southern parts of Australia, South America, South Africa, New Zealand and the Pacific.

As it moves, it affects rainfall and climate by switching between warm and cold phases, changing sea surface temperatures to either a degree Celsius cooler or warmer than average. Colder sea temperatures mean less evaporation, less cloud formation and hence less rain.

The wave is also believed to interact with other large weather effects, such as El Nino/La Nina, enhancing or reducing the impact depending on the circumstances.

"This is comparable to El Nino," said Cai Wenju, a research scientist with Australia's government-backed Commonwealth Scientific and Industrial Research Organisation (CSIRO), said of the Antarctic wave's impact.

Far-Reaching Influence

CSIRO scientists, who have taken the lead in monitoring the wave after its discovery three years ago, believe it can have a greater effect on southern weather patterns than its famous cousin, El Nino.

Scientists are still piecing together information on the Antarctic effect, with tracking and analysis requiring satellites, instrumentation and powerful computers not available before the 1980s.

What is known, however, is that the Antarctic Wave, with two warm peaks and cool troughs, takes up to nine years to rotate clockwise around the southern hemisphere.

A cold wave in conjunction with an El Nino year would produce doubly dry conditions, a warmer wave in a La Nina year, which usually brings heavy rains to Australia, would produce doubly wet weather. But a warmer wave may modify dry conditions from a Pacific Ocean El Nino.

This year, with the Pacific in a La Nina phase, the wave is credited with saving much of the southern world from greater downpours of rain and flooding than they might have had.

A huge part of the southern world, from about 25 degrees latitude south, is in the weather domain of the wave.

This includes most of southern Australia, much of Argentina, Brazil, Uruguay and Chile, all of New Zealand, part of Madagascar and most of South Africa and Namibia.

Which Dog Barks Loudest?

Australian scientists see an intricate link between the Antarctic Wave and the Pacific Ocean's El Nino/La Nina and an Indian Ocean effect called the Indian dipole.

"(It's) like a three-headed dog. The challenge lies in predicting which head will bark the loudest," Peter Baines, leader of the ocean modelling group at CSIRO Atmospheric Research, wrote in a recent article in local magazine *Ecos*.

Australia's climate was now known to be influenced by three oceans, the Pacific, Indian and Southern, Baines said.

This year the polar wave, in its cold phase, is believed to have modified downpours from the fading La Nina effect.

Baines is running complicated mathematical constructions of the Antarctic atmosphere and ocean models on computers.

The vast expanses of the Southern Ocean are under scrutiny as never before. ❑ ***(cb Billy-Ace Baker)***

Giant Iceberg Threatens Shipping

17 August 1999, WASHINGTON (AP)—The National Ice Center issued a warning Tuesday that an iceberg almost the size of Rhode Island threatens shipping in the ocean between South America and Antarctica.The iceberg, named B-10A, measures 24 by 48 miles and is in the shipping lanes in the vicinity of latitude 58 degrees, 36 minutes South, longitude 57 degrees West.

The iceberg is drifting southeast at about 7 to 9 miles per day, and smaller icebergs are breaking off as it moves into relatively warmer water.

A cautionary zone has been established 165 miles in radius around the berg, the ice center reported.

The ice center has been tracking the parent iceberg, B-10, since January 1992. In the summer of 1995, it broke into two pieces, the larger of which became B-10A. The smaller iceberg drifted west in and along the Antarctic ice pack and eventually became too small to warrant tracking.

The Suitland, Md.-based National Ice Center provides worldwide operational sea ice analyses. It is operated by the Navy, the National Oceanic and Atmospheric Administration, and the Coast Guard. ❑ ***(multiple contributors)***

Scientists Fear Epidemics From Frozen Viruses

3 September 1999, LONDON (Reuters)—Deadly prehistoric viruses may be frozen beneath the polar ice caps and could unleash epidemics if they are released into the atmosphere, researchers told the latest New Scientist magazine, published Wednesday.

Scientists at Syracuse University in New York found a plant virus in the Greenland icepack which led them to believe that strains of influenza, polio and smallpox could be buried in icy tombs that could be opened by a warm spell. "We don't know the survival rate, or how often they get back into the environment. But it certainly is possible," Tom Starmer told the magazine.

The researchers found the tomato mosaic tobamovirus (ToMV) while examining four cores extracted from the Greenland ice containing material between 500 and 140,000 years old. Although they are not sure, they suspect strains of the frozen viruses they found are still infectious because of strong protein coats which allow them to survive in harsh environments. "If you've got these things lying in the ice for a thousand years or more and their usual host has not had to deal with them, this may be a source of epidemics," said Alvin Smith, a virologist at Oregon State University. He believes the discovery could also explain how identical viruses appeared after a 20-year-interval on opposite sides of the United States. They might have spent years in the ice before emerging decades later.

The researchers are planning further research on ice cores taken from Antarctic and Arctic ice. ❑ ***(cb Billy-Ace Baker)***

Arctic Feast

Fairfax (VA) Journal*, 2 July 1999, p. 2**—Fifty Beluga whales, trapped by shifting ice in the Canadian Arctic, have become easy prey for hordes of ravenous polar bears lurking around the only breathing hole available for the marine mammals. Large numbers of polar bears lie in wait for the sea mammals to surface and then attack, sometimes dragging the whales onto the ice. Observers in the area near Ellesmere Island said they have not seen this many whales trapped by ice since the 1960s. Local Inuit Eskimos have punched five new breathing holes in the ice in an effort to prevent further attacks by the bears, but the greatest hope is that the seasonal melt will create an escape channel for the marine mammals. ❑ ***(cb Peter Barretta)

Tourists Rescued From Arctic Glacier

11 September 1999, NEAU, Alaska—Five cruise ship passengers and their sightseeing pilot were airlifted into Juneau today after a downed helicopter forced them to spend the night on Herbert Glacier in snow, wind and freezing temperatures.

The six people suffered no major injuries and no ill effects from their night on the ice, said Coast Guard Petty Officer Mark Hunt. "Those people seem to be doing just fine;" Hunt said. "They looked OK, they were smiling as they were carried from the helicopter. A few of them were able to walk themselves."

A nine-person rescue team reached them before midnight Friday with tents, food and cold-weather survival gear. "It wasn't like they were staying at the Hilton, but they were taken care of," Hunt said.

Coast Guard flight crews were expected to head back to the glacier to bring down four employees of Temsco Helicopters who made abortive rescue attempts in two other helicopters on Friday afternoon. One of those helicopters crashed on the glacier about 20 miles north of Juneau, but nobody was seriously hurt, the Coast Guard said.

Exactly why the three helicopters went down on the glacier was not clear, although the area has been shrouded with clouds and fog for the past several days. The Federal Aviation Administration and the National Transportation Safety Board planned investigations.

The incident began when the Temsco Helicopters sightseeing flight carrying a pilot and five tourists from the cruise ship Crown Princess failed to return on schedule at about noon. The company dispatched four of its employees in two more helicopters to search for the missing aircraft. When those helicopters failed to return, the company called the Coast Guard. Three more helicopters dropped off the nine-person rescue team with food, tents and cold-weather survival gear early Friday evening. The team climbed 600 feet onto a plateau and hiked three miles through snow, wind and freezing temperatures before spotting a light that led them to the original helicopter, said Petty Officer Roger Wetherell.

ASSOCIATED PRESS PHOTO

Emergency workers help a rescued man off a Coast Guard helicopter after he and five others were airlifted from a glacier to Juneau, Alaska.

They found the passengers alive and unhurt. The passengers were: Rhoneel Zell, 51, and Richard Zell, 53, both of Novato, Calif.; William McIntyre, 72, of Irvine, Calif., and his son, William, 40; and Deborah Morgan, 42, whose hometown was not available. The name of their pilot was not available. The four other Temsco employees were together more than a mile away from the main rescue, but had ample survival equipment, Wetherell said. All 19 people were forced to remain on the glacier until this morning because of darkness and poor weather that included falling snow, freezing temperatures and 15-20 mph winds, Wetherell said. ❑ *(cb Charlotte Sinclaire)*

Russia Fires Submarine Missiles from the Arctic Ocean

2 October 1999, MOSCOW (Reuters)—Russia test fired a submarine- launched ballistic missile on Saturday, the third missile test in two days, the Navy said.

"The Petropavlovsk-Kamchatsky, a Pacific Fleet atomic submarine (Delta-3 by NATO classification)...successfully launched a ballistic missile from an underwater position in the Okhotsk Sea, a navy press statement said.

"The missile head hit the testing ground in the region of the Barents and the White Sea dead on time," it said.

The press-release did not say what kind of missile was tested. Officials were not available for comment."

The Navy press release said Russia launched another submarine-launched ballistic missile (SLBM) of the same type on Friday, the first time it had tested an SLBM since the beginning of the year.

It also carried out a test launch of a land-based Topol ballistic missile from the Arctic testing ground of Plesetsk on the same day. The missile had been on duty for more than 14 years, much longer than originally planned.

Cash-strapped Russia has the world's second largest nuclear arsenal after the United States but can rarely afford expensive test launches.

The test series coincides with a visit to Russia of U.S. Energy Secretary Bill Richardson, whose remit covers in part nuclear arms control.

The money-conscious military said its successful launch of the Topol and its accurate performance meant it would be safe for Russia to extend the life of similar weapons beyond their original limits rather than spend money on replacements.

Defence analysts say Russia is working on a new SLBM to match its new generation, land-based Topol-M missile. So far, just a handful of the Topol-M missiles have been deployed in silos.

Colonel-General Anatoly Sitnov, the Defence Ministry's procurement chief, said on Tuesday Russia had until 2007 to replace its ageing nuclear arsenal before it becomes obsolete. ❑ *(cb Billy-Ace Baker)*

Antarctic Tourism Breaks 10,000 For First Time

by Brian Shoemaker

During the 1998-99 summer season approximately 10,026 people traveled to the Antarctic on private expeditions, exceeding 10,000 visitors for the first time. Of these Antarctic visitors, 79 participated in land-based expeditions, 90 traveled aboard commercial yachts and 9,857 traveled aboard commercially organized tour vessels according to the International Association of Antarctica Tour Operators (IAATO). IAATO is a tour industry organization founded in 1991 to advocate, promote and practice safe and environmentally responsible private-sector tourism.

Travel to the Antarctic.

According to Denise Landau, Secretary of IAATO, most visitors traveled to the Antarctic on 15 commercially organized tour vessels from November 1998 to March 1999, a slight increase over the 1997-98 season total of 9473 ship based visitors. All but one of the tour vessels that sailed in 1998-99 were operated by members of IAATO. Seven of the 15 were of Russian registry.

Ms Landau informs that almost all of the Antarctic voyages are to the Peninsula region during the four-month Austral summer, departing from Ushuaia, Argentina or, in fewer numbers, from Punta Arenas, Chile or Stanley, Falklands. Of 102 ship voyages in 1998-99: 96 were to the Antarctic Peninsula Region; one to East Antarctica; three to the Ross Sea; and two voyages included both the Ross Sea Sector as well as the Antarctic Peninsula

For the more adventuresome there were 11 commercial yachts operating in the Antarctic Peninsula during the last summer season. A total of 90 fare paying passengers traveled there aboard *Pelagic*, *Damien II*, *Croix St. Paul II* , *S. W. Vorwerk*, *Golden Fleece*, and yachts organized through Croisieres Australes in France (*Baltazar, Boulard, Fernande, Kekilistrion, Kotick I, Valhalla*)

Adventure Network International (ANI) conducted flying operations out of Punta Arenas, Chile for the fourteenth consecutive season. It operated one Lockheed L-382 G Hercules and two DHC-6 Twin Otters from the ANI camp at Patriot Hills blue icefield in the Heritage Range (80° 18'S, 81° 21' W) flying passengers to remote Antarctic sites including the South Pole.

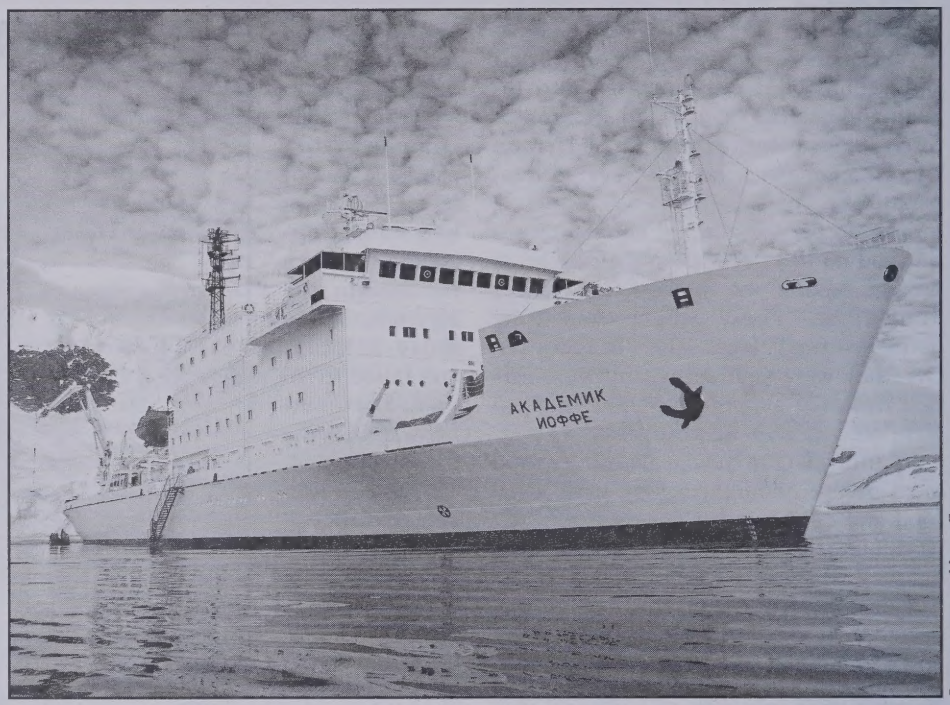


Photo provided by Marine Expeditions

RV Akademik Ioffe touring the Antarctic peninsula.

In addition to the 10,000-plus tourists who set foot in Antarctica, Croydon Travel of Victoria, Australia, operated Qantas Antarctic Day Sightseeing flights from Melbourne aboard Qantas Airlines Boeing 747-400 aircraft for the fifth consecutive season. According to the Australian Antarctic Division, a total of 3,127 passengers participated on 9 flights from November 1998 to February 1999. In addition, the plane carried 23 crew per flight. Over 13,000 persons have taken part in the overflights since 1994-1995. In addition,there were 22 overflights of the Antarctic Peninsula from Punta Arenas, Chile each carrying 40-60 passengers.

Ms Landau noted that approximately 13,906 people will visit the Antarctic on commercially organized tour vessels, 200 on land-based expeditions and 192 on commercial yachts in the 1999-2000 summer. "Antarctic tourism is not exploding as some have suggested! Our numbers may seem large at first glance, however, our man-days in Antarctica amount to 2% of the man-day total for the national scientific programs that operate on the continent on a year-round basis and can not begin to match the annual attendance of 3,657,172 visitors to Yosemite National Park in 1998 as another perspective. Our visitors are also governed by stricter rules than our national parks and must adhere to Antarctic Protocol standards; they are well briefed before they arrive and are carefully shepherded by an environmentally trained staff." She also added that, "IAATO members are in the business creating ambassadors to the rest of the world for Antarctica—citizens who will have a strong and informed voice concerning Antarctica's future. We are very proud of our record in this respect." ❑

Big Catch for Tiny Island

***Alaska*, September 1999, p. 11**—The Inupiat Village of Little Diomede has ample reason to celebrate these days.

In May, six hunters from the remote Bering Strait island landed the village's first bowhead whale in more than 60 years.

Practically all in the village, even children, helped haul the 28-ton leviathan onto the narrow, icy shore. Women cooked chunks of whale meat as the men butchered the 28-foot bowhead, said Darlene Ahkvaluk. Her husband, Raleigh, shot the whale while another villager harpooned it from their walrus-skin boat.

"It meant a lot to everybody," she said. "We are all really happy and excited and energized."

Meat and muktuk were distributed to the 175 residents of the island, which is 130 miles northwest of Nome between Russia and the western tip of Seward Peninsula.

Villagers celebrated the long-awaited whale catch with a potluck, and later a July Fourth festival. With plenty of meat to spare, residents shared their bounty with relatives in other communities, including Nome, Teller and Wales.

Cold war politics and environmental restrictions had kept the villagers from hunting bowheads since the last kill in 1937. In 1992, the Alaska Whaling Commission allocated two whale strikes per year to Little Diomede, but thick sea ice thwarted hunting excursions until this year. ❑ ***(cb Peter Barretta)***

Russians Scale Back Research at South Pole

***New York Times*, 31 August 1999, by Malcolm W. Browne**—Russia's impoverished scientific institutions face ever more severe cuts in financing. Among the latest victims of Moscow's austerity measures is Molodezhnaya Station, the headquarters station of Russia's network of bases on the white continent. Molodezhnaya (pronounced Mah-luh-DYOZH-na-ya), which had a peak summer population of scientists and technicians of more than 200, was ordered two years ago to begin closing down and by now no one is left there except a half dozen caretakers who are moth-balling the station for indefinite closure.

Staffs at other Russian Antarctic stations have been severely reduced and Russian support operations throughout the continent have been cut to the bone.

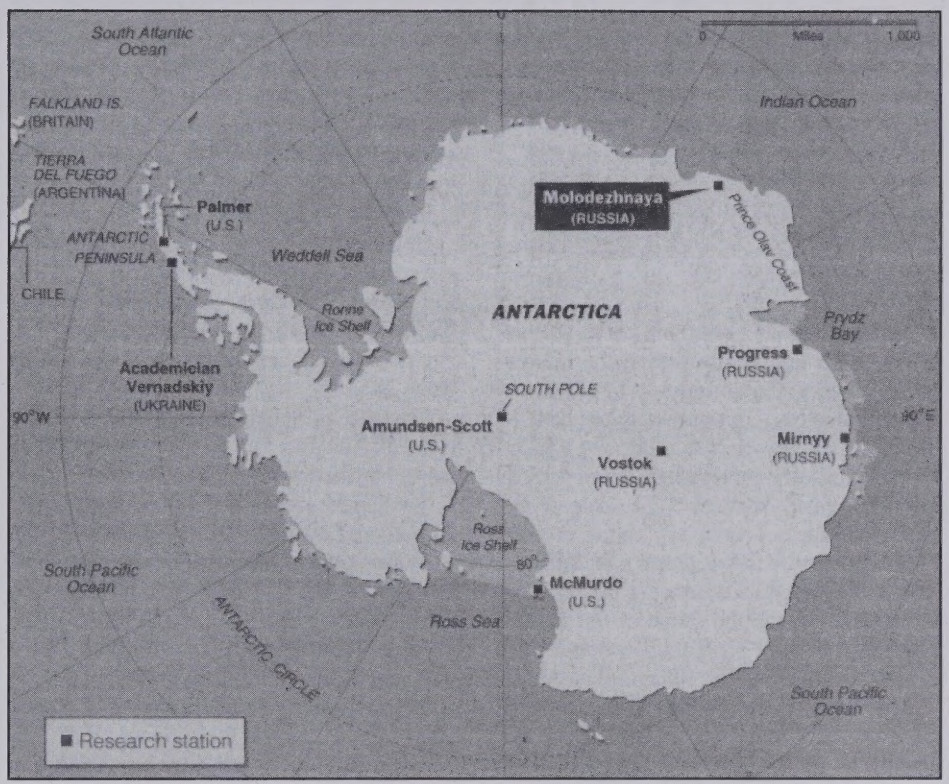
Molodezhnaya, founded in 1963, lies on East Antarctica's Prince Olav Coast, south of the Indian Ocean. Besides coordinating activities at other Russian bases, Molodezhnaya was a center for glaciology, geology and life sciences.

Dr. Vladimir O. Papitashvili, a specialist in Arctic and Antarctic geophysics, has conducted research for Soviet and Russian institutions in polar regions since the 1970's. He said in an interview that Molodezhnaya was not being closed forever. "It will be preserved for future use, although that won't come during my lifetime," he said.

Dr. Papitashvili, a Georgian, now conducts polar research for the University of Michigan and for the Danish Meteorological Institute in Copenhagen. With the coming of the Southern Hemisphere spring in September he plans to return to Vostok Station — a Russian base on the South Polar Plateau that is now partly assisted by non-Russian air transport, equipment and scientists, including Americans.

Aside from being the world's low-temperature record holder (minus 128.6 degrees Fahrenheit, recorded on July 21, 1983), Vostok Station and the two-mile thickness of ice on which it rests overlie an enormous lake, whose water has been sealed off from the outer world for perhaps as much as one million years. (See "Ice Covered Antarctic Lake," p. 19.)

Because of financial problems, the Russian staff of scientists at Vostok has been halved. The station is exceptionally difficult and expensive to maintain because it is beyond the range of suitable Russian aircraft. Nearly all its supplies must be brought overland from Russia's coastal Mirnyy Station, which is supplied by ship when the sea ice breaks up.



New York Times

The harrowing supply run from Mirnyy to Vostok, 870 miles, is made by a tractor-hauled sledge train. The train takes one month to reach its destination.

Dr. Papitashvili said that during most of the 42 years since Vostok Station was founded, two trips were made each year by the supply train, but recently the schedule was reduced to just one round trip to save money. Because the train must bring 300 tons of fuel to the base each year, correspondingly less room is left for other supplies, although in summer, United States C-130 ski-equipped transport planes have begun bringing light equipment to Vostok from McMurdo Station.

Russia is not the only nation facing problems maintaining its Antarctic stations, scattered across a continent the size of the United States and Mexico combined.

Great Britain has also had to cut back. In 1956, the British Antarctic Survey established Faraday Station near the northern tip of the Antarctic Peninsula, some 700 miles south of Tierra del Fuego. The location was ideal for the study of marine wildlife, but in the early 1990's Britain decided to divest itself of Faraday.

Instead of abandoning or moth-balling the base, London turned it over to Ukraine in 1996, which has renamed the station *Academician Vernadskiy.*

"It was a good deal for both nations," said Erick Chiang, operations chief for the United States' National Science Foundation in Antarctica. "Ukraine got its own ready-made base in Antarctica, and Britain unloaded the maintenance cost.

"I think we'll see more of that kind of deal in the coming years," Chiang said. "Antarctica really needs to be more fully internationalized." ❑ ***(cb Peter Anderson)***

Saving the Antarctic Toothfish

13 June 1999, *Press*, LIMA, Peru—Antarctic Treaty members including New Zealand have resolved to take fresh steps to stop pirate fishing of patagonian toothfish.

The fish, popular among pirates because of its high price on restaurant menus, was targeted by a Belize-flagged ship in February in French territorial waters. The Greenpeace ship *Arctic Sunrise* chased it around the Southern Ocean for weeks. Chile was later accused by Isofish, representing conservation organisations and licensed toothfish fishing companies, of involvement in an pirate fishing ring. A former Chilean Government official was named as the "pirate king." (See associated article on page 6, Vol 2, No. 13 of the *Polar Times*).

Associate Foreign Minister Simon Upton said yesterday that the 13th Antarctic Treaty Consultative Meeting in Lima had adopted a resolution calling for effective measures for the conservation of the toothfish, including a catch documentation system.

The group does not have responsibility for the management of the Antarctic fishery, but most parties to the Antarctic Treaty are also members of the Commission for the Conservation of Antarctic Marine Living Resources. ❑ ***(cb Billy-Ace Baker)***

Japan Opposes Whaling Limits in Antarctica

By Chris Hawley, ST. GEORGE'S, Grenada (AP)—New Zealand, Australia and Brazil pushed a controversial plan Thursday to make nearly half the world off-limits, should commercial whaling resume.

Opposed bitterly by Japan, which hopes to lift a 13-year ban on commercial whaling, the proposal would create new sanctuaries in the South Pacific and South Atlantic, adding to existing sanctuaries in the Indian ocean and other Atlantic waters.

Japan walked out briefly in protest Thursday from the annual meeting of the International Whaling Commission when Switzerland called for the commission to regulate the killing of smaller animals related to whales, such as the Dall's porpoises hunted by Japan and pilot whales hunted by St. Vincent and the Grenadines.

"It's none of their business," said Japanese delegate Mayasuki Komatsu, claiming those animals lie outside the scope of the group's 1946 charter. "We are going to continue to kill Dall's porpoises just like you kill cows."

The commission postponed a decision on the Swiss proposal after Japan walked out. Japan kills about 17,000 Dall's porpoises a year out of an estimated population of 400,000.

During the weeklong meeting in Grenada, which ends Friday, Australia and New Zealand have said they want to protect the breeding grounds of whales that reproduce in tropical waters then head south to feed around Antarctica.

Brazil aims to protect sperm, humpback and right whales—as well as develop ecotourism like whale-watching excursions. "We don't want that to be threatened by foreign fishermen," said Brazilian delegate Jose Truda Palazzo.

Commercial whalers drove many whales to near-extinction this century, but they began to rebound after a 1986 moratorium.

The sanctuaries are in large part voluntary, since the somewhat toothless commission has no powers other than to deny countries membership—and only member countries are subject to its restrictions.

Even member countries can argue their way past inconvenient restrictions.

For example, Japan kills some 500 minke whales a year, most in the supposed Southern Ocean sanctuary where they number about 760,000. Tokyo claims they're needed for "scientific research," but environmentalists complain that the meat ends up with restaurants and fishmongers.

The proposed southern Atlantic sanctuary would stretch from the equator to the boundary of the Southern Ocean sanctuary. Commission scientists will study the South Pacific proposal and report to the commission at its 2000 meeting in Adelaide, Australia.

New sanctuary proposals would leave only one significant area open for whaling, off the west cost of South America. ❑ ***(cb Billy-Ace Baker)***

South Poll Doctor Has Breast Cancer

19 October 1999, by Amy Beth Graves, CLEVELAND (AP) - Nearly five months after she found a lump in her breast, a doctor rescued from the South Pole confirmed that she has cancer and she will undergo treatment.

Dr. Jerri Nielsen, 47, continued to shy away from international attention, saying she would not grant any interview requests.

"The diagnosis of breast cancer has been confirmed and I will undergo treatment. My spirit is strong," Nielsen said Tuesday in her first public statement since returning to the United States on Sunday.

"It's good to be back with my family and friends in the United States," she said in the statement issued through the National Science Foundation.

Nielsen, of the Youngstown, Ohio area, treated herself with chemotherapy until she was rescued Saturday from the Amundsen-Scott South Pole Research Center.

The only doctor among the 41 researchers at the station, Nielsen discovered a lump in her breast in June. She had medical supplies dropped to her a month later during a daring mercy mission.

The supplies allowed her to perform her own biopsy and begin self-treatment with chemotherapy. She e-mailed photographs of slide samples of the tumor to doctors in the United States.

Despite her illness, Nielsen kept busy with her duties up until she left the South Pole, said her sister-in-law, Diana Cahill.

Nielsen's rescue from the coldest place on Earth was possible only after the Antarctic winter relented slightly, making it warm enough - 58 degrees below zero - to risk a flight to evacuate her by a C-130 crew from the New York Air National Guard. In her statement, Nielsen thanked those who rescued her and helped with her treatment.

"My heartfelt thanks go out to my South Pole friends, colleagues and the general public for their encouragement and best wishes during my ordeal," she said. ❑ ***(cb Billy-Ace Baker)***

Editor's Note: We are very happy that Dr. Nielsen is back home and, on behalf of the American Polar Society, wish her a speedy and complete recovery.

The Freezing Polar Bear

One afternoon in the Artic, a father polar bear and his son polar bear were sitting in the snow. The son polar bear turned to his father and asked, "Dad, am I 100% polar bear?"

The father polar bear replied, "Of course, son, you're 100% polar bear."

A few minutes pass, and the son polar bear turns to his father again and says, "Dad, tell me the truth. I can take it. Am I 100% polar bear? No brown bear or panda bear or grizzly bear?"

The father polar bear replies, "Son, I'm 100% polar bear, your mother is 100% polar bear, so you are definitely 100% polar bear."

A few more minutes pass, and the son polar bear AGAIN turns to his father and says, "Dad, don't think your sparing my feelings if it's not true. I gotta know—am I 100 percent polar bear?"

The father polar bear was distressed by this continued questioning and asked his son, "Why do you keep asking if you're 100% polar bear?"

"Because, Dad, I'm freezing!"

(Received from Michael J. D. Lawrence, Good Clean Funnies List)

Scientists Reach North Pole, Classrooms

***Federal Computer Week*, 24 May 1999, p. 16, by Colleen O'Hara**—In what may be the ultimate in distance learning, a group of NASA scientists this month concluded a trip to the North Pole, where they used the Internet to send live video feed and chat with students around the world, creating the first Internet link to the remote region.

As part of the North Pole Project, scientists and engineers from NASA's Goddard Space Flight Center traveled to Resolute Bay and Eureka, Canada, before heading to "the top of the world." They broadcast the first live World Wide Webcast from the North Pole and had students from preselected schools across the continental United States, Europe, Asia, South America and Australia participate in live Internet chat sessions.

"It really was the global internet. We had the whole world on line," said Michael Comberiate, team leader at NASA and nicknamed NASA Mike. "With the Internet and PCs, we were able to bring [our work] directly to the kids and get them interested in science and technology."

Despite the harsh weather conditions, the technology worked well, Comberiate said. When the NASA satellite was in position over the North Pole, it would point its 10-foot dish antenna toward the scientists, who would unload their generator-powered portable satellite ground station, set up an 18-inch pizza-pan antenna on a camera tripod and point it toward the satellite, which was only about 0.9 degrees above the horizon. The satellite provided an Internet connection via NASA's White Sands, N.M., ground station.

Meanwhile, the team created a miniproduction system by plugging a video camera into a Dell Computer laptop and using the camera to record the scientists as they conducted their experiments. Students were able to send live questions over the Internet that were received by the scientists on the computer.

Keeping the equipment—not to mention themselves—warm in temperatures hovering around minus-20 degrees Fahrenheit was a challenge, Comberiate said. For example, they had to use toe warmers, usually used by campers and skiers, to keep the video camera warm.

The group also used an Iridium LLC satellite phone to reconfirm each day's scheduled events and itinerary.

Tom Albert, education specialists at NASA, said the agency is always looking for ways to enhance its education programs. "The use of Internet as a tool is pretty powerful," he said.

An archive of the expedition's Webcasts and pictures is available at cool-space.gsfc.nasa.gov/northpole. ❑ *(cb Billy-Ace Baker)*

A Man and His Mountain

Marking the Globe

***American Legion*, by Harry R. Spohn, NORTH PLATTE, Nebraska**—The single most memorable moment in my 70 years of life happened the morning the mail brought to our home the announcement there was a mountain bearing my surname on the continent of Antarctica!

The letter said the mountain had been named for me in 1961. But for whatever reason, I was not notified of this honor until I contacted the U.S. Department of the Interior in 1975.

My work at the South Pole science station during the 1962-63 wintering-over period is all but forgotten; our recorded cold temperature of minus 110 degrees Fahrenheit has been shattered. But Mount Spohn will remain on appropriate maps of Antarctica, and will speak of the legacy my wife and I leave to present and future family members; and the mountain will always say, "Someone named Spohn was here." ❑ *(cb Billy-Ace Baker)*

Ed Note: Harry Spohn speaks for all of those who work diligently in unglamorous roles, but who, in total, are the backbone of the U.S. Antarctic Program.

Gould Proves Its Worth

NATIONAL SCIENCE FOUNDATION

RV Lawrence M. Gould *at Palmer Station, Antarctica*

***Antarctic Sun*, 17 January 1999, p. 9, by Tim Bjokne**—It's tough being the new kid in the U.S. Antarctic Program's family of ships.

The *R/V Laurence M. Gould*, which joined this family in January of 1998, follows in a great tradition of Antarctic research vessels. The *Gould* occupies a role once filled by the *R/V Hero* (See *Hero Sails Again,* p. 18) and more recently by the Norwegian-flagged *R/V Polar Duke*. The *Gould* faced some serious operational problems early on, which had some folks dreaming of the *Duke*'s triumphant return. However, the *Gould* has since won over the hearts of many and has proven itself as a first-class science platform, meeting virtually all the contract's specifications.

"(The ship) is working great," said Mark Gisclair, NSF operations manager for Edison Chouest Offshore (ECO), a worldwide ship builder and operator headquartered in Louisiana. "I was impressed with some of the sit-reps and (other) reports coming back."

The *Gould* is the second Antarctic research vessel built and operated by ECO for the Antarctic program. Its older and larger sister ship, the *R/V Nathaniel B. Palmer*, has been operating primarily in Antarctica's Ross Sea since 1992.

"There is not much science that the *NBP* can do that we can't," said Warren Sanamo, the captain of the *Gould*. "The big difference in the science between the two vessels is the different work areas that the vessels can operate in. The *NBP* can work anywhere . We are limited by the ice conditions in the area."

In the *Gould*'s short career, it has already supported nine science cruises and supply runs to Palmer Station, and each one has seen improvements in the new ship's capabilities.

"In my opinion, the *Gould* is a great ship, and we have proven in our first year of service that the *Gould* is very capable of meeting and actually exceeding the expectations of the scientific community," Sanamo said. "I am very proud to be the master of the *Gould*." ❑

US Struggles To Track Russian Arctic Nuke Tests-Report

WASHINGTON, Oct 2 (Reuters)—The CIA has concluded it cannot monitor Russia's low-level nuclear tests accurately enough to ensure compliance with a global test ban treaty.

The Washington Post, quoting senior U.S. officials, reported that the Russians carried out two tests last month in the Arctic, but intelligence data from seismic sensors and other monitoring equipment could not determine the exact nature of those trials.

Russian officials have assured the Clinton administration that the two tests involved conventional explosives. However, U.S. surveillance satellites monitoring the Russian test site recently have observed the kind of activity that usually precedes and then follows a low-level nuclear test, the newspaper said.

Although the U.S. intelligence community has a long-standing concern about the difficulty of gathering data on low-level nuclear tests, the recent Russian tests, as well as others like it earlier this year, prompted a new assessment of CIA capabilities.

The result of that review has found these tests fall into a gray area where the agency cannot reliably distinguish between a conventional explosion and a low-level nuclear test or even natural seismic activity, officials said.

U.S. officials said that assessment is not a dramatic departure from earlier CIA positions but instead a refined judgment about its ability to handle with a subject that is inherently uncertain, the Post reported.

The matter takes on expanded meaning this week when the Senate debates the Comprehensive Test Ban Treaty, an agreement signed by 154 nations but only ratified by 23 of the 44 "nuclear-capable" nations.

Senate Majority Leader Trent Lott on Thursday abruptly scheduled a vote on the nuclear test ban accord after refusing to take that step since President Bill Clinton sent the treaty to the Senate for ratification two years ago.

Lott, a Republican from Mississippi, says the treaty endangers national security. Clinton has promised to fight for ratification, which requires two-thirds support from the Senate. Debate will start next Friday and continue on October 14, culminating in a vote on ratification.

U.S. Defence Secretary William Cohen conceded on Saturday in Singapore the Clinton administration faces an "uphill battle" in winning Senate ratification.

Cohen warned that failure to ratify the treaty would send a wrong signal to budding nuclear powers like India and Pakistan and to the rest of the world.

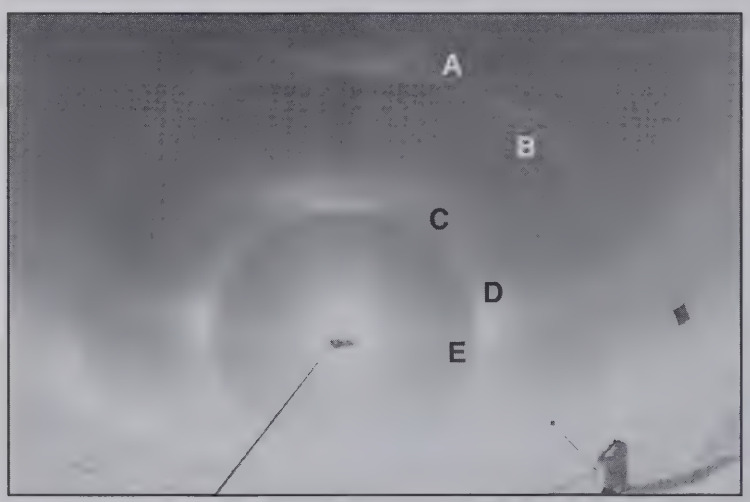
Supporters say the CTBT is a deterrent to small states that might want to develop nuclear weapons.

The agreement provides for an international seismic monitoring network and would give the international community a strong basis for action against any country found to have conducted tests. ❑

Editor's Note: The U.S. Senate has since rejected the Comprehensive Test Ban Treaty.

Anatomy of a Light Show

The features from the photo on pages 12-13 are sketched below and labeled. A description, feature by feature, has been provided by Dr. Walter Tape of the University of Alaska. The photo was taken by Dr. Jarmo Muilanen of Oulunsalo, Finland.



By Walter Tape, from "Atmospheric Halos"—Depending on their shapes and orientations, ice crystals in the atmosphere can reflect and refract sunlight into a variety of arcs and halos.

A—Circumzenith Arc

Caused by light coming off the edges of plate-shaped ice crystals floating horizontally, this phenomenon can have colors as vivid as a small rainbow. It can be seen as many as 25 days a year in some locations.

B—Supralateral Arc

Column-shaped ice crystals produce this formation found at the base of the circumzenith arc.

C—Upper Tangent arc

Column-shaped ice crystals are also responsible for this effect.

D—The 22-Degree Halo

This halo, found 22 degrees from the sun, is caused by light refracted by plate-shaped crystals.

E—Parhelion

The bright spots known as sundogs are the most common form of halo. They, too, result from light's interaction with plate-shaped crystals. ❑

Antarctic Ozone Hole Smaller This Year

6 October 1999, WASHINGTON (Reuters)—The ozone hole over Antarctica—the region where Earth-shielding ozone typically gets depleted—is smaller this year than last, NASA reported on Wednesday.

"This Antarctic year's ozone depletion area, or ozone hole, is very large, but slightly smaller than that of 1998," said Richard McPeters, one of the scientists who used data from the Total Ozone Mapping Spectrometer aboard NASA's Earth Probe satellite to measure the hole.

This year's southern ozone hole covered 9.8 million square miles (25.38 million sq km) on September 15, according to preliminary satellite data.

The largest hole in the ozone over Antarctica was 10.5 million square miles (27.19 million sq km). It was recorded on September 19, 1998.

Ozone shields life on Earth from the harmful effects of the sun's ultraviolet (UV) radiation. Antarctic ozone losses are caused by chlorine and bromine compounds released by chlorofluorocarbons (CFCs) and halons. ❑ ***(cb Billy-Ace Baker)***

Siberian Mammoth Holds Promise for Cloning

13 October 1999, WASHINGTON (Reuters)—Scientists said Wednesday they had dug a woolly mammoth from the Siberian permafrost and transported it, virtually intact and still frozen, to a laboratory for study.

They used a radar imaging technique to "see" the mammoth in its icy grave, then excavated a huge block of frozen dirt around it to preserve the 23,000-year-old creature. "It is the first time that a mammoth carcass from the permafrost of Siberia has been excavated under such cold conditions," Dick Mol of the Museum of Natural History in Rotterdam.

Samples have been sent to a laboratory for possible attempts to clone the animal, and scientists will study the carcass to try to find out why and how it died.

The paleontologists, led by North Pole and Siberian explorer Bernard Buigues, were directed to the site by local residents who found a tusk sticking up out of the ground. They dug up the head, which had partially thawed and decayed, and decided to stop digging for fear of destroying their find. Larry Agenbroad, a mammoth expert at Northern Arizona University, said, "They used jackhammers to break up the frozen soil and then they dug a trench around the mammoth and then tunneled underneath before breaking it free."

On a rare sunny day last Sunday, a helicopter lifted the 22-ton block of frozen dirt and flew it 200 miles to the Russian city of Khatanga. In Khatanga it has been put into an ice cellar, which has a constant temperature of -12 or -13 degrees C (-8 or -9 F).

"In April we will return to Khatanga," Mol said. They will use a rack of hair dryers to thaw out the block, layer by layer, and examine every speck of plant matter and animals remains they can find in the soil surrounding the mammoth.

Discovery Channel, which funded and filmed the expedition, released videotape showing the helicopter carrying the huge block. The mammoth's tusks curved out of one side of the block, and its thick hair matted the surface.

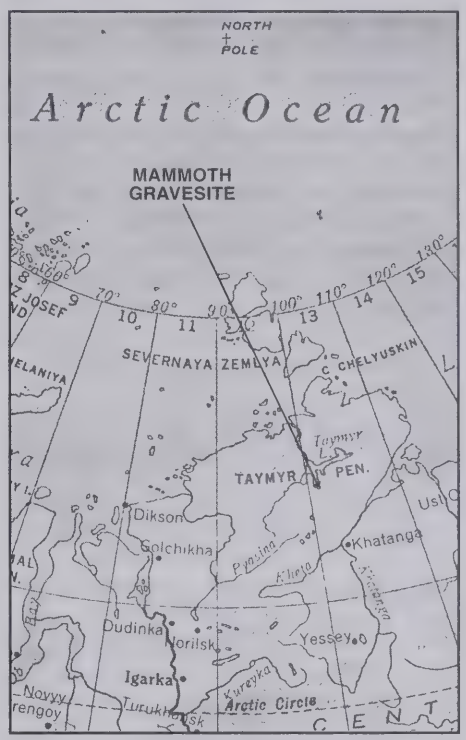
The mammoth, dubbed "Zharkov" after a local man who first discovered its tusk sticking out of the ice in 1997, was a nine-foot-tall adult male that would have looked like a hairy elephant to the modern eye.

Carbon dating of bits taken from the mammoth at the site show it is 23,000 years old. Other tests show it died at the prime of its life, aged about 47 years, Mol said.

Agenbroad said, " If they can get an intact cell nucleus, they may try to clone the mammoth using an elephant egg and an elephant as a surrogate mother. Or they might use frozen sperm, if they can get any, to try to create an elephant-mammoth hybrid."

The excavation also offers good opportunities to paleontologists trying to understand what Siberia looked like 20,000 years ago.

Mol said. "This is, for paleontology, a big discovery." ❑ ***(cb Billy-Ace Baker)***



New Type Of Dinosaur Unearthed In Antarctic

20 July 1999, BUENOS AIRES, Argentina (Reuters)—Fossils from a newly discovered land-roving dinosaur adapted to a temperate climate have been unearthed on an Antarctic island near the tip of South America in what experts are calling a rare find.

The shin and splint bones and part of the thigh bone of a 12-foot (four-meter) long biped herbivore were discovered in February on the rocky beach of James Ross Island, 30 miles (50 km) south of Argentina's Marambio Base at the tip of the Antarctic peninsula.

Uncertain of what they had found, two geologists from the Antarctic Institute of Argentina showed the 74-million-year-old fossilized bones to Fernando Novas, a paleontologist with the Argentine Museum of Natural Sciences.

"This was a type of dinosaur as yet unknown. Now five species of dinosaurs have been discovered in Antarctica," Novas told Reuters Tuesday.

The plant-eating member of the Iguanodon genus, a type of dinosaur first discovered in Britain, had four limbs, a long tail, a short neck, stood upright and lived in what was a temperate climate, he said.

The discovery shows dinosaurs may have been able to adapt to different types of climates, such as the Antarctic climate of the time where average water temperature ranged from 50 to 55 degrees Fahrenheit (10 to 12 Celsius), Novas added.

Prior to this discovery, four different types of dinosaurs, the aquatic mosasaur (technically a lizard, not a dinosaur)and land-roving hypsilophodon, ankylosaurus and hadrosaurus, had been found in the Antarctic peninsula region. The only other Antarctica dinosaurs come from the Central Transantarctic Mountains and include a crested theropod, Cryolophosaurus, and a prosauropod.

Another expedition led by Jim Martin of the Museum of Geology in South Dakota, found the remains of the duck-billed hadrosaur on the remote Vega and Seymour Islands, also near the tip of South America in early 1998.

"Dinosaur fossils from this part of Antarctica will always be relatively rare because the rocks were deposited in a shallow marine setting. Therefore, the dinosaur remains are those that were washed out from shore," Martin told Reuters.

He said last year's hadrosaur find was the "first concrete proof" that Argentina and Antarctica were connected during the age of dinosaurs.

Novas agreed.

"Certainly Antarctica was populated with dinosaurs but most of the continent is covered in ice which makes it difficult to excavate," he said. ❑ ***(cb Billy-Ace Baker)***

USS Hawkbill Completes Fifth Arctic Science Mission

Pearl Harbor, Hawaii (NNS), by Comsubpac Public Affairs—USS *Hawkbill (SSN 666)* returned to Pearl Harbor today at the end of a three-month patrol. However, the crew wasn't searching for an enemy submarine in the name of defense, but rather put their training to the test for a different national cause: science.

The submarine conducted the fifth of five planned science expeditions to the Arctic Ocean in a joint venture between the Navy and the National Science Foundation (NSF).

While sailors and scientists alike praise the tremendous data collection and valuable military and scientific understanding gained in the Arctic over the five-year joint venture, the program has come to an end for the foreseeable future due to a lack of available submarines.

"We've gone from as many as 96 submarines in 1990 to a projected 50 submarines by the year 2003. Planners are already being asked which valid missions the remaining submarines can fulfill and which missions will go unfulfilled," said Rear Adm. Al Konetzni Jr., Commander, Pacific Submarine Force.

Hawkbill departed Pearl Harbor March 18 and entered the edge of the ice pack off the Alaskan coast about a week later. On the night of March 25 the order to dive was given by CDR R.H. Perry, *Hawkbill's* Commanding Officer. The ship dove under the ice and conducted research there for almost two months surfacing several times through the pack ice (see back cover).

NSF launched Scientific Ice Expedition (SCICEX) 99 in cooperation with the US Navy and the Office of Naval Research. Chief scientist for SCICEX 99, Margo Williams of the University of Hawaii, said that *Hawkbill* helped investigate the character of waters that ice cover had previously made largely inaccessible to civilian researchers. The SCICEX team examined the Gakkel Ridge, the slowest spreading mid ocean ridge in the world. The ship took thousands of water samples and conducted multiple geophysical mapping surveys of the bottom of the arctic ocean.

CDR Perry states that he had a special task to complete as part of the cruise; "I had an honored guest ride with me. In my safe, I carried the cremains of Dr. Waldo Lyon. It was truly fitting that Dr. Lyon ride *Hawkbill* on its final voyage to the Arctic. Dr. Lyon rode the *USS Sargo* on the first first winter transit of the Bering Strait in 1960. My crew and I were honored to scatter his ashes at the North Pole on 3 may 1999, almost one year following his sudden death. Dr Lyon was a great man. The United States owes him a great debt of gratitude for what he did for the Navy and the Submarine Force." (See "Under Ice," p. 22.)

"I'm really proud of the crew. We had many different challenges. We ran a two-month operation under the ice; however, everything was executed flawlessly by the crew and the scientific research team," said Lt.Cmdr. Dave Fitzgerald of San Marino, Calif., *Hawkbill's* executive officer. ❑ ***(cb Billy-Ace Baker).***

Editor's note: Information about SCICEX and Hawkbill can be found on the web at www.Csp.Navy.Mil.

President Clinton Plans Trip To Antarctica

PHOTO BY INGRID STONI

President William Clinton speaks to William Stone, a young U.S. citizen living in Christchurch at The International Antarctic Center.

15 September, 1999, CHRISTCHURCH, New Zealand (The Press)—President Clinton is setting his sights lower than even beyond down-under New Zealand. He wants to stage an expedition to Antarctica.

"I expect that you will let me come back one more time, so I can fulfill my lifelong desire to go to Antarctica," he told an audience at the International Antarctic Center devoted to research on the frozen continent. Christchurch is the point of origin for most U.S. Government expeditions to Antarctica. No U.S. president, or former president, has ever gone to Antarctica.

Bill Clinton was nearly the first United States President to visit the Antarctic, American ambassador Josiah Beeman says. Mr Beeman told The Press yesterday that Mr Clinton had been keen to continue south from Christchurch after his visit. Although visits to Antarctica have resumed after the winter isolation, organisers of Mr Clinton's visit considered it too risky so early in the season. "We would have liked to get him down there and he wanted to go, but it just wasn't possible," Mr Beeman said. No American President has visited Antarctica, although Vice-President Al Gore has been to "The Ice".

Clinton didn't give a time frame, but said he was inspired by Sir Edmund Hillary, the 80-year-old adventurer who scaled Mt. Everest in 1953 and led a traverse to the South Pole in 1958. Sir Edmund shared the platform with Clinton, and talked briefly about his trip.

"He started it," said Clinton. "Some people called it the last great journey on earth." Clinton joked that the explorer is "referred to in our family as my second favorite Hillary."

At the International Antarctic Center, Clinton engaged in a video conference with the U.S. scientific team currently based at Cape Roberts, Antarctica. One team member told Clinton: "Come visit us." "Give me a rain check," Clinton said. ❑ ***(cb Billy-Ace Baker)***

Canadian Iceman Said To Be 550 Years Old

28 September 1999, by Allan Dowd, VANCOUVER (Reuters)—Initial testing indicates artifacts found with an iceman frozen in a Canadian glacier are about 550 years old, not thousands of years many people had originally speculated, officials said on Tuesday.

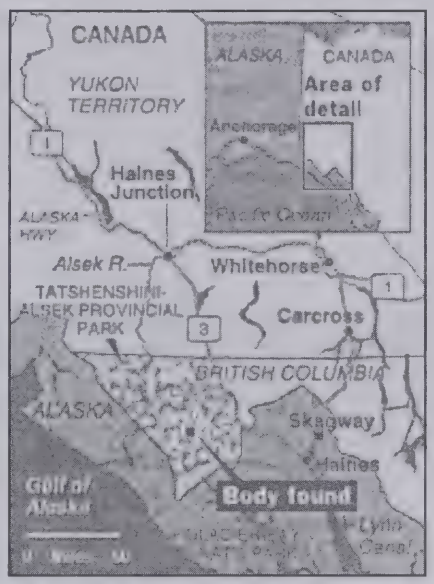
Archaeologists are still very interested in the discovery, announced with much fanfare in August, because the remains still predate regular contact between Europeans and North American natives.

"Human remains in a frozen state dating to precontact times are extremely rare, as are the associated well-preserved artifacts made with organic materials," officials said in a news release about the preliminary radiocarbon test results.

Scientists conducted the initial tests on the artifacts—including an animal fur cloak and weaved wood-fiber hat—found with the human remains, because the testing of the body itself is a more complicated process.

Archaeologists believe people have lived in that region of North America for at least 10,000 years, leading to widespread speculation the remains were significantly older than they now appear to be.

Scientists downplayed the age issue. "We know precious little about what these people (immediately before contact) were like," said Al Mackie, archaeologist at the Royal British Columbia Museum.



The remains were discovered in late August by three school teachers who were crossing a glacier during a sheep-hunting trip in Tetchenshini-Alsek Park, near the British Columbia border with Yukon and Alaska.

Preliminary evidence indicates the remains were those of a man who may have died after falling into a glacial crevasse, which is still a danger to present-day travelers in the rugged and sparsely populated area.

A moose found frozen in the glacier near the iceman's body was determined to date only to the 1960s.

Provincial archaeologists are studying the remains in conjunction with the Champagne and Aishiki First Nations, on whose historic territory they were was found and in whose language iceman is called Kwaday Dan Sinchi ("Long Ago Person Found)."

"At this age, Kwaday Dan Sinchi has great potential for tieing in with oral history of the area and with local knowledge of precontact clothing tools and land use patterns," said Bob Charlie, chief of the Haines Junction, Yukon-headquartered tribe.

As do many native people in North America, the Champagne and Aishiki people kept track of their history in the form of stories passed from generation to generation. Officials have only recently begun putting the history into written form.

Europeans only began significant trading with native groups in northern British Columbia in the late 1700s, the initial tests indicate the remains also predate Christopher Columbus's trans-Atlantic voyages.

Ancient intact bodies have been preserved in ice in the Alps, Andes, Siberia and Arctic Canada, but this discovery is the first of its kind in western Canadian mountains, officials said.

Officials have stressed since the find was announced that because the man is believed to be of aboriginal origin, any research on the remains will have to be done in accordance with the cultural concerns of Indian tribes in the area. ❑ *(cb Billy-Ace Baker)*

Ice Core Buoys Evidence Humans Changing Climate

By Rick Callahan—A two-mile-long ice core laboriously drilled out of an Antarctic ice sheet shows that levels of heat-trapping greenhouse gases are higher now than at any time in the past 420,000 years.

As the longest ice core record of Earth's weather history obtained to date, the core also shows that those gases—carbon dioxide and methane—play a big role in warming the planet when ice ages end.

But how this icy record will influence current theories about global warming blamed on human activity isn't clear, the researchers said.

"The ice core gives us the past, not the future. But it adds to our thinking about the future, about the future of our climate," said Jean-Robert Petit, director of research at the National Centre for Scientific Research in Grenoble, France. It's clear that greenhouse gas levels are unprecedented compared with the previous 400,000 years."

The core was extracted from 1992-98 by a U.S.-Russian-French team at Russia's Vostok research station, the coldest spot on Earth. Petit and team members endured readings as cold as minus 70 Fahrenheit, though the station holds the world record low of minus 129.

Each cylinder-like chunk of ice drilled out of the ice sheet contains a record of snowfall, atmospheric chemicals, dust and bubbles of air. Those clues, trapped in icy layers like tree rings, enable scientists to reconstruct past climates.

The lengthy Vostok ice core is particularly significant because previous cores taken from Antarctica and Greenland dated back only about 150,000 years and showed just two ice age cycles. The new core reveals four ice ages at roughly 100,000-year intervals, shedding new light on how the icy interludes end.

All four ice ages appear to have given way to balmier times after levels of the heat-trapping gases carbon dioxide and methane rose by amounts smaller than the increase blamed on human industry in the past century.

The multinational team reported its findings in the June 3 issue of the journal *Nature*.

"This study is probably the most convincing evidence to date that humans are making some really large changes to Earth's climate system," said Jonathan Overpeck, head of the paleoclimatology program at the National Geophysical Data Center in Boulder, Colo.

"This core is telling us to get busy and understand the climate system because it really could change," said Richard Alley, a professor of geosciences at Pennsylvania State University. ❑ *(cb Peter Barretta)*

Hero Sails Again

The *Research Vessel Hero,* retired from polar service and rotting away as a static display in Reedsport, Oregon, has received a new chance at life and sails once more.

The venerable vessel made her shakedown cruise in the Arctic in the spring of 1967 under the command of Captain Sidney Hartshorne. Satisfied that she was seaworthy Capt. Hartshorne took her on her first cruise to Antarctica the following December baptizing her in Antarctic Peninsula waters. For the next 17 years she served researchers in the frozen waters of the south sailing from South American ports of Punta Arenas and Ushuaia.

Over the years she developed a cadre of admirers, both scientists and crew, who still relive their experiences aboard. *Hero* had a number of Masters besides Captain Hartshorne, but the most memorable was Pietr Lenie, diminutive, only 5'4", but in firm control of both crew and researchers.

She was the namesake of the Stonnington sealer, *Hero,* a 47 foot sloop Captained by 19 year old Nathaniel Palmer when he discovered the Antarctic Peninsula in 1820. Sailing in the modern *Hero* gave everyone an appreciation of what it was like in the early days of sealing in Antarctic waters - the days of "iron men and wooden ships."

The feeling of loyalty to the *RV Hero* that all who sailed her exuded did not extend to the National Science Foundation who summarily retired her in 1985. She was delivered to Reedsport, Oregon by a saddened crew to be converted to a static display. Many "old hands," both scientist and sailor, made pilgrimages to Reedsport over the years to pay their respects and relive their experiences. Over the years it became apparent to all that she was slowly rotting away and that if someone did not rescue her she was destined for the scrap heap.

Photo by Bruce Norris

RV Hero ***departs Reedsport on July 26, 1998.***

Bruce and Paula Norris, of Rainier, Oregon, reading the auction notices of the State of Oregon in early 1998 noted that the *Hero* was being sold in a bankruptcy sale. They visited Reedsport to assess the vessel and fell in love, however, they felt that the ship would sell for much more money than they could amass. Nevertheless, they were able to scrape together $5,000 and to their surprise and elation won the bid.

Soon after taking possession of the ship they were told that they would "have to move her out" within the month. Upon inspection they found her engines were frozen from neglect and needed caulking above the waterline if she would be put to sea. The resolute couple, working around the clock, had her seaworthy in three weeks and cast off from the pier in Reedsport on July 26, 1998, sailed down the Umpqua River and put to sea (see photo). Two days later she was moored at Rainier, Ore., on the Columbia River near the Norris' home.

Today she has been spruced up and is ready for sea again. Perhaps the National Science Foundation would like to charter her for a science cruise. Could Pietr Lenie be enticed to take the helm? ❑ ***(cb Brian Shoemaker)***

Greenland's Glacier Grows

***Fairfax (VA) Journal*, 15 August 1999, p. C6, by Christian Wienberg, COPENHAGEN, Denmark**—Moving as fast as 100 feet a day, a speedster glacier in Greenland is puzzling Danish geographers.

Some glaciers don't move that far in a year. Others, known as "searching glaciers," pick up the pace considerably, but they're rare in the Arctic, and none are as big as the one under investigation on Qeqertarsuaq Island.

The galloping glacier—nearly two-thirds of a mile wide—came to the attention of Copenhagen University geographers Ole Humlum and Niels Nielsen when they were touring the island with their students in July.

Humlum and Nielsen had noticed the glacier on a trip four years earlier and were astonished to see how far it had moved since then, traveling six miles down a valley, Nielsen said Thursday in an interview.

Taking a look at satellite data, they found the glacier on some days sprinted up to 100 feet.

Normally, glacier movement is decided by the amount of snow falling on mountain slopes. The snow turns to ice and moves downward, forming the glacier.

As the glacier moves downward, temperatures rise and ice melts from its tip. Sometimes the influx of snow exceeds the outflow of melted water.

"It is the balance between those two things that decides whether the glacier moves forward or backward," Nielsen says.

But that can't explain the speed a searching glacier can reach. One theory is water melting from a mountain ice cap seeps under the glacier. "The water works as a lubricant, and the glacier then slides down the slope," Nielsen explains.

A second theory is that mechanisms of temperature and pressure can cause the glacier to stick very tightly to the ground. Behind it, huge amounts of ice build up, causing the glacier to move quickly forward.

Others speculate that searching glaciers are the result of climatic changes, maybe caused by the greenhouse effect.

Approximately one-tenth of the world's land is covered by ice. In Greenland, that ratio is more than eight-tenths, with 720,000 of the country's 880,000 million square miles covered by an ice cap that is the second-largest in the world.

Qeqertarsuaq Island is in Disko Bay on Greenland's west coast, 280 miles north of the country's capital, Nuuk. ❑ ***(cb Peter Barretta)***

Ice-Covered Antarctic Lake May Harbor Unknown Life

3 August 1999, National Science Foundation—Microbes entirely unknown to science may exist in liquid water in Lake Vostok, thousands of meters beneath the Antarctic ice sheet. That possibility is one of several intriguing mysteries that justify undertaking the logistical challenges of exploring the lake, according to a new report from a workshop funded by the National Science Foundation (NSF).

The report, "Lake Vostok: A Curiosity or a Focus for Interdisciplinary Study," concludes that the lake "may represent a unique region for detailed scientific investigation" for several reasons. Among them is the possibility that conditions under the ice may approximate those on Europa, a frozen moon of Jupiter, and so may indicate whether life may be able to exist in harsh conditions elsewhere in the solar system.

The report represents the conclusions reached by scientists from a variety of fields who met in Washington D.C. last November. The Lamont-Doherty Earth Observatory at Columbia University and the University of Hawaii jointly organized the meeting.

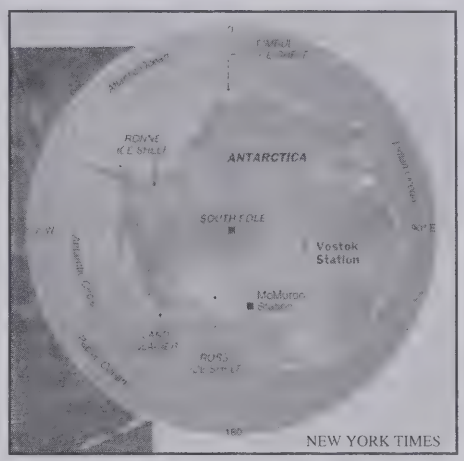
Lake Vostok is roughly the size of Lake Ontario in the United States. Vostok Station—a Russian scientific outpost, which once recorded the lowest temperature on earth (-126.9 degrees Fahrenheit)—is located in the vicinity of the lake. As part of a joint U.S., French and Russian research project, Russian teams have drilled down into the ice covering the lake, producing the world's deepest ice core. But drilling was deliberately stopped roughly 120 meters above where the ice and liquid water meet to prevent possible contamination.

The report concludes that Lake Vostok merits further scientific investigation, including devising a way to drill through the ice sheet to reach the water—and lake-bottom sediments—without contaminating them.

The report notes that that there are several reasons other than the possibility of discovering unknown forms of life for exploring the lake. Water below the ice, which has been cut off from the outside world for hundreds of thousands of years, may have a unique chemical composition. There may also be an active tectonic rift below the lake, which may be warming its waters. Or sediments at the lake bottom may contain a record of ancient climate conditions.

Conditions under the ice may approximate those on Europa, a frozen moon of Jupiter.

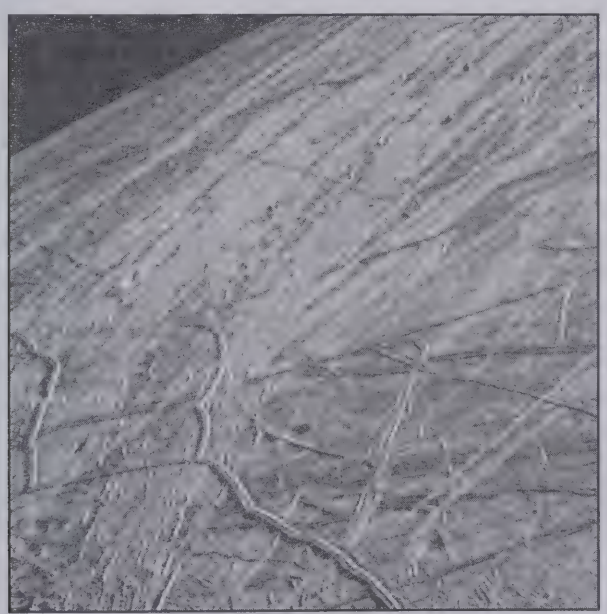
Robin E. Bell, a geophysicist and a co-editor of the report, says it "illustrates the emerging importance of the lake for understanding the processes which may have triggered the evolutionary explosion on earth and perhaps on other planets as well as deciphering the geologic history of Antarctica."



NSF's Office of Polar Programs sent a delegation of U.S. scientists to represent the consensus of opinion contained in the report at a meeting of the international Scientific Committee on Antarctic Research (SCAR), in September at Cambridge, England.

At that meeting, scientists discussed the scientific objectives of sub-glacial lake exploration and examined the logistica and engineering requirements for exploring the lake.

The SCAR meeting also assessed the risk of contamination posed by various exploration techniques and considered a schedule for accomplishing the scientific goal of exploring the lake. ❑ ***(cb Billy-Ace Baker)***



Europa's Icy, Ridged Plains

This image of Jupiter's icy moon Europa shows a complex surface of numerous criss-crossing pressure ridges. If sufficient heat is present inside Europa, an ocean may be present beneath this icy crust.

Europa's Ice Floes

Europa, about the size of the Earth's moon, has an icy crust in some areas that has been severely fractured, resembling ice floes in Earth's polar seas. Is there life beneath this ice? Perhaps the Vostok drilling project will provide some clues.

(Photos provided by Dr. Ronald Greely, Arizona State University)

Russia Arctic Winter Shipping Fears Are Easing

13 October 1999, by Aleksandras Budrys, MOSCOW (Reuters)—A senior Russian shipping official said on Wednesday that his earlier forecast that Arctic shipping would face problems from severe weather had not been borne out, and he saw no major disruptions to winter shipping.

"Thickening of ice, which had been officially forecast to start this year 10 to 15 days earlier than normal, just did not happen," Nikolai Babich, head of maritime operations at the Murmansk Shipping Company, told Reuters.

In August Babich said an unusual build-up of ice in Arctic waters could cause major disruptions to shipping along Russia's northern sea route from mid-October. The route is vital to the country's largest metals firm Norilsk Nickel (NKEL.RTS.

"But several cyclones from the Atlantic have passed over the region since, and there is still no snow in Murmansk although it is normally here in the first days of October," Babich said on Wednesday.

"And the thick ice in the Arctic has only just started forming now instead of at the beginning of the month," he said.

He said Russia's six-strong fleet of nuclear icebreakers, operated by Murmansk Shipping Company, was practically ready for the winter navigation season, with three vessels already working in the Arctic.

He said the icebreakers *Yamal, Arktika* and *Taimyr* were leading convoys of ships along a 2,500 mile channel from Murmansk on the western Kola peninsula to Pevek in Russia's far east.

But from the middle of November the eastern sector would become inoperable and these vessels would be responsible for keeping open the western sector, which streches to the port of Dudinka on the river Yenisei, Norilsk Nickel's home port.

Two of the remaining ships, Rossiya and Vaigach, are under repair and the third, Sovietsky Soyuz, is waiting to be refuelled in Murmansk. Babich said that they would soon be ready to reinforce the fleet if necessary.

Babich, who has 30 years of experience working with Murmansk shipping, added that he now believed this winter would see easier weather conditions after two years in which navigation was complicated by exceptionally severe weather.

"The weather in the Arctic is like a pendulum, which now seems to be taking a swing backwards," he said.

"From now on we are expecting anomalies of a different kind, that is, exceptionally easy ice situations, although we don't yet have a scientific basis for this view." ❑ ***(cb Billy-Ace Baker)***

Malaria Wiping Out UK Zoo Penguin Population

7 October 1999 (Reuters)—Britain's penguin population is being severely hit by a brain disease believed to be linked to an outbreak of bird malaria.

All 26 rare penguins at Marwell Zoo in Hampshire have died and Edinburgh Zoo has lost several since the start of the summer. Penguin experts have linked the deaths to a kind of avian malaria which eats into the brain, leaving the birds weak and bringing a speedy death.

"The malaria is spread by other birds carrying infected midgets and mosquitoes. We found these insects breeding in the pool," said a spokeswoman for Marwell. "Our pool has no chlorine (to kill the insects) so that could be something to do with it."

She said other zoos across the country were preparing to protect their penguins with anti-malárial drugs. London Zoo, which has 41 penguins, said it had lost five birds in the past 15 years to malaria, "but we will be keeping a very close eye out now."

Avian malaria also occurs in the wild and especially hits African birds. The disease is restricted to bird species and cannot spread to humans. ❑ ***(cb Billy-Ace Baker)***

American Polar Society Inducts Conrad 'Gus" Shinn as Honorary Member

PHOTO BY BRIAN SHOEMAKER

Bill Blackwelder and Gus Shinn pose in front of* Que Sera Sera *while displaying Gus' Honorary Membership Medallion.

29 October 1999, PENSACOLA, Fla.— Fellow aviators and friends of Gus Shinn gathered for a luncheon at the National Museum of Naval Aviation to witness the induction of LCDR Conrad 'Gus' Shinn as an Honorary Member of the American Polar Society. An awards ceremony followed where LCDR Bill Blackwelder, representing the Society, hung the Honorary Member Medallion over Gus' shoulders and read the certificate signed by APS President Richard Chappell.

Shinn is most famous for being the first pilot to land at the South Pole on Oct. 31, 1956 establishing the base that today is the symbol of U.S. presence in Antarctica. However, his career goes back to 1946 when he was assigned to test and develop skis for the R4D. These skis made it possible for the aircaft to land in the field and opened up the Arctic and Antarctic for thorough and efficient scientific investigation and exploration. In 1947 Gus flew an R4D from the *USS Philippine Sea* into Little America and from there flew several long range aerial mapping flights, photographing over 200,000 square miles of unexplored territory. He also flew seveal flights with Admiral Richard E. Byrd, the leader of the expedition.

After a tour flying the Berlin Airlift, Gus was selected as the first pilot for Operation Deep Freeze. He participated in Operation Deep Freeze I, II and III and essentially "wrote the book" on polar flight operations. He not only made the first landing at the Pole but led the next five flights there, ferrying the men and equipment for building the first South Pole Station in his aircraft *Que Sera Sera* (see back cover of *Polar Times*, Vol. 2, No. 8).

When the ceremony in the museum was complete, the party walked out to the flight line where Gus posed for photographs with the *Que Sera Sera,* which is enshrined on the museum flightline—a moving finale for the day. ❑ ***(cb Brian Shoemaker)***

Ozone Hero: The Man Who Mended The Hole

***The Press*, 1 June 1999, by Seth Robson, CHRISTCHURCH, NZ**—Nobel Prize winning scientist Professor Paul Crutzen was in Christchurch this week. He talked about his most famous achievement—solving the riddle of the ozone hole.

When members of the British Antarctic Survey published studies showing severe ozone depletion above the South Pole in 1985 the scientific community was stunned.

Scientists had known about ozone depletion for almost two decades, but none had suspected the problem was so severe. How could this completely unexpected environmental catastrophe have arisen in a place thousands of miles from the world's industrial centres?

The ideal candidate to answer this question was a self-taught Dutch chemist named Paul Crutzen who, in the late 1960s, came up with a theory that suggested human activity was impacting on ozone levels in the upper atmosphere.

Professor Crutzen got involved in chemistry while working as a computer programmer at the University of Stockholm, Sweden, in 1959. By chance, one of his programming jobs involved a bit of ozone chemistry.

It turned out that the process by which ozone was created and destroyed was a bit more complex than expected.

To understand ozone you must ascend into the stratosphere, a part of the atmosphere more than 8km above the surface of the earth. While the earth's atmosphere contains huge amounts of gases, such as nitrogen and oxygen, there is hardly any ozone. If you brought all the ozone from the stratosphere down to ground level it would form a layer only 3mm thick over the surface of the earth due to atmospheric pressure.

Unconstrained by traditional chemical theories Professor Crutzen developed his own theory about the impact of human activity on the ozone layer. The theory was based on chain reactions involving nitrogen oxides in the atmosphere.

"It turned out that these chain reactions were very important and they could be influenced by human actions which increased the amount of catalysts in the atmosphere," Professor Crutzen says.

In the atmosphere he discovered that chlorine, released in large quantities by industrialised nations producing chlorofluorocarbons (CFCs), was a much more powerful catalyst for ozone-depleting reactions.

Scientists know CFCs do not occur naturally in the atmosphere because they are not present in air bubbles found in prehistoric ice. The problem with ozone depletion is man's creation.

Chlorine is decreasing in the lower atmosphere.

At first Professor Crutzen's research did not cause concern. Atmospheric testing had revealed that the chlorine and nitrogen oxides, like two warring mafia families, were neutralising each other in the atmosphere before they had a chance to eat away much ozone.

"By the mid-1970s we thought we understood the chemistry of the atmosphere rather well and made predictions about ozone depletion," Professor Crutzen says.

It was thought that the biggest reductions in ozone would occur high in the stratosphere but that the bulk of it would be unaffected because of the battle between chlorine and nitrogen oxide catalysts. Then, in 1985, came the news from Antarctica about the ozone hole.

Professor Crutzen, who by then was executive director of the Max Planck Institute for Chemistry in Mainz, West Germany, spent the next few years studying the ozone hole.

Eventually it became clear that in the very cold stratospheric temperatures, found only above Antarctica, ice crystals were forming. Reactions on the surface of the crystals were freeing up chlorine while removing the nitrogen oxides.

"One of the mafia families is gone and the other family can happily attack the ozone unimpeded by the nitrogen oxide," says Professor Crutzen, whose work netted him a host of awards culminating in the Nobel Prize in Chemistry in 1995.

These days he is something of a celebrity in the scientific community lecturing to packed audiences around the world.

According to Professor Crutzen, decreasing use of CFCs by industrialised nations, including a decision in 1996 to halt all emissions, has slowed the buildup of chlorine in the atmosphere.

"Because of these measures a major catastrophe has been averted. If all goes well we predict it will take about 40 years to heal the ozone hole. We can see the results already," he says.

Chlorine is decreasing in the lower atmosphere although it may take longer for the effect to spread to the stratosphere.

While he is proud of the role science has played in averting an ecological disaster, the professor steers clear of emotional debate about man's impact on the planet. "I am a scientist. I leave that stuff to the politicians," he says. ❑ ***(cb Billy-Ace Baker)***

NSF Ices Pier

***Science*, 5 March 1999**—building materials are hard to come by in Antarctica, so when the McMurdo research station needs a new pier, it creates one out of ice. Freeze water around steel pipes and cable, sprinkle with dirt, and bingo, you have a 249-meter-long pier. A giant ice cube, however, will eventually crack. So, when the six-year-old pier began to deteriorate, the National Science Foundation (NSF), which operates McMurdo, wanted to tow it out to sea and ditch it. Technically, that's "ocean dumping," so the NSF sent the Environmental Protection Agency (EPA) a detailed analysis of the ice to prove it does not contain harmful contaminants. Eventually, NSF explained, the pier should melt in the warmer waters, dropping a few kilometers of nontoxic pies and cable to the ocean floor.

Icebreaker* Polar Star *on left and* MV Greenwave *tied to the ice pier on right, in McMurdo.

The EPA okayed the dump, and on Valentine's Day NSF waved goodbye as the *Polar Sea* icebreaker started lugging the 150,000-plus ton pier to oblivion. ❑ ***(cb Kenneth Drake)***

Antarctic Solar Eclipse

Polar Whispers*, News of the New Zealand Antarctic Society, Issue 14, September 1999, p. 2**—A total solar eclipse of the sun will occur in East Antarctica in late 2003 and is generating much interest among specialists as the air over Antarctica will be much clearer than that in the Northern Hemisphere. The first Antarctic mainland site to experience the eclipse will be Russia's Mirny Station on 24 November. The total eclipse zone will then curve inland over the Polar Plateau, crossing near Japan's dome Fuji facility (lat. 77 degrees S, long. 40 degrees E), before leaving the continent near India's Maitri Station and Russia's Novolazerevskya Station. The totality of the eclipse will last about two minutes. The last total solar eclipse viewed in Antarctica was on 12 November 1985, although only part of the continent experienced it. The next Antarctic eclipse after 2004 will be on 4 December 2021. ❑ ***(cb Peter Barretta)

The Frigid Mistress: Life and Exploration in Antarctica

By George Doumani; Noble House; 304 pages; ISBN 1-56167-476-1

Review by Brian Shoemaker

Everyone who has spent time in the field in the Antarctic will identify with this book—armchair explorers will find it intriguing. In this authentic account, Dr. Doumani gives readers more than a passing glimpse into the minds and hearts of those who know Antarctica. As part of the United States team of geophysical researchers during the International Geophysical Year in 1958 and several later expeditions, Dr. Doumani relates the day-to-day hardships as well as the triumphs that this inhospitable land can generate.

He writes in a style that brings the reader along with him not as an observer, but as a participant in his expeditions. He obviously kept a detailed diary and it is the foundation of the book, but the writing recreates an authentic dialogue of events, description of people involved, and account of exploration in the field that is personal and up close. Dr. Doumani is not out to create heroes of himself or others, but to describe the role that each person played in the drama—allowing all to emerge as heroes. In so doing he has developed a story that is engaging, personal and, above all readable. Several old polar hands from this era of exploration stated to me that they could not put the book down—it moved them, took them back to a time past and refreshed their sense of having been "on the ice". There is no finer testament! ❑

PHOTO BY BILL HESS

Gift of the Whale: The Iñupiat Bowhead Hunt, a Sacred Tradition

By Bill Hess; September 1999; 240p illus; Sasquatch Books; $40 (1-57061-163-7), DDC

Review by Nancy Bent

The yearly hunt for bowhead whales of the Iñupiat (Eskimos) living around Barrow, Alaska, is central to their culture and traditions. A new book that is part anthropology, part documentary, and wholly satisfying, captures the lives of these people. Hess, photographer and writer, has worked for years living with the hunters and documenting their hunts for bowhead and beluga whales and smaller prey, such as seals.

The skill of the hunters and their knowledge of the biology of the whales generally allow for successful hunts, and blubber, meat, and other whale products not only provide food but are the basis for the entire culture as sharing of the whale ties the community together. The aboriginal right to hunt bowhead whales (an endangered species) remains controversial, but Hess' book presents a strong case for the cultural and spiritual side of the argument and as such is highly recommended. ***American Library Association booklist ©September 1999*** ❑

Under Ice: Waldo Lyon and the Development of the Arctic Submarine

By William M. Leary; College Station, Texas: Texas A&M University Press, 1999

Reviewed by Gordon I. Peterson, Senior Editor , **Sea Power** *magazine.*

It has been said that one can usually determine the caliber of a man by the amount of opposition it takes to discourage him. By this measure, William M. Leary's biography of Dr. Waldo Lyon provides an inspiring account of how one man's lifelong tenacity in the face of bureaucratic lethargy and skepticism *can* make a difference in translating a vision to reality. During the early years of World War II, Lyon began his quest to develop an Arctic submarine for the U.S. Navy that would be fully capable of operating in one of the most challenging operational environments imaginable—beneath the frozen surface of the Arctic Ocean. For 55 years, he championed—at times single-handedly—a research effort to provide the Navy with the information it would need to design a submarine that could operate safely and effectively in the world's most poorly understood ocean.

In the words of retired Chief of Naval Operations Adm. Frank B. Kelso II, "The nuclear submarine made Arctic operations possible, but without the knowledge of Waldo Lyon I doubt our Navy would have ventured under the sea ice to the [North] Pole." Lyon's painstaking efforts to acquire this knowledge are meticulously detailed by Leary in references to numerous interviews with Navy submarine commanders, declassified patrol reports, and the scientific journal that Lyon compiled for more than five decades. As a result, *Under Ice* provides an authoritative and comprehensive account of the U.S. Navy's under-ice operations and of Lyon's pioneering role in making those operations possible—as was recognized by his selection for the President's Medal for Distinguished Federal Service during the Kennedy administration.

It is noteworthy that, prior to the USS *Hawkbill*'s under-ice expedition to the Arctic in 1999 (see article on page 16), the submarine's commanding officer required every officer on board to read chapter seven of Leary's book—a description of USS *Sargo*'s hazardous 1960 Arctic cruise. ❑

Edited and reproduced courtesy of Sea Power Magazine.

American Polar Society membership lapel pins are available. They are a work of art, with an Emperor penguin and a polar bear emblazoned against a background of the sun riding low on the horizon of a pale blue summer sky. This is surrounded by brass lettering of the "American Polar Society" set in a field of black, symbolic of the six month winter at each of the poles. The price is $5.00. Order using the enclosed membership envelope.

Thank you!

Obituaries

John Clabaugh Leitch

By Brian Shoemaker

"Clay" Leitch, well known world traveler died of heart failure this summer in Baltimore; he was 91.

Like his contemporary August Howard, Clay Leitch had never been "to the ice". However, like August Howard, he had an abiding interest in the Polar regions that spanned seven decades. Like August Howard who made his contribution publishing the *Polar Times* for over 60 years, Clay contributed to our polar heritage through the creation of polar cachets that were taken to the poles on numerous expeditions (see example to the right) which are sought by collectors worldwide.

He was also an inveterate traveler who circled the globe many times with his small 21pound travel bag. One of the focus' of his travels was to visit shipyards where icebreakers and other ships were manufactured and periodically overhauled. He attended the keel laying of the *Polar Sea* and the *Polar Star* and was on personal terms with most of the ship captains.

He is survived by his wife, the Former Anne Haroldson, a professional ice skater who stated that she "let Clay do all of the traveling because I had enough of it as a skater." He will be remembered by his friends throughout the polar community and his legacy of cachets will last forever. ❑

Dr. Harrison Holt Richardson

27 July 1999, CLAIBORNE, Md. (AP)—Dr. Harrison Holt Richardson, a member of the first U.S. Antarctic expedition in 1939 and 1940, died July 17. He was 80.

Richardson served as a dog-team driver and a meteorological observer on the expedition led by Admiral Richard E. Byrd. Richardson took the first color movie films of the south polar region.

Mount Richardson in Antarctica is named in his honor.

He later served as the medical officer on other U.S. Navy expeditions to both the Arctic and the Antarctic. ❑ *(cb Billy-Ace Baker)*

Charles Hollister

BOSTON (AP)—Charles Hollister, who was well-known for his research into burying radioactive waste under the ocean, died after falling 60 feet while rock climbing in the Big Horn Mountains Monday. He was 63.

Hollister was vice president and senior scientist at the Woods Hole Oceanographic Institution on Cape Cod. Hollister was an oceanographer for the U.S. Geological Survey and a research fellow at Columbia University's Lamont-Doherty Geological Observatory before joining the staff at Woods Hole in 1967.

Hollister also was a past president of the American Alpine Club, the nation's oldest mountaineering organization. He participated in the first ascent of the 16,860-foot Vinson Massif in the Sentinel Range of Antarctica in 1967. ❑ *(cb Billy-Ace Baker)*

OAE Paul Streich

20 August 1999, by Capt. Moe Morris, COLORADO SPRINGS—Our shipmate and veteran OAE Paul (Bob) Streich passed away this past Wednesday the 18th. Memorial services will be held Tuesday at 11:00 AM (MT)here in Colorado Springs. What a fine courageous gentleman and representative of our generation. So proud of his Antarctic accomplishments and always willing to aid so many causes. Let us pause wherever possible at the Tuesday time and unite in a prayer of thanksgiving for the friendship and service of one of our own. The decommissioning of VX-6 reunion, of which he was a plankowner, was one of his happiest times. ❑ *(cb Capt Moe)*

BACK COVER

The nuclear-powered attack submarine USS Hawkbill *surfaces through the ice during SCICEX-99. (Photo by Erik Hill,* Anchorage Daily News*) See page 16 for story of the* Hawkbill*'s cruise to the Arctic in Spring 1999.*

Navy Capt. Price Lewis Jr. Dies

He Managed Polar Operations at National Science Foundation

13 Aug 1999, —Price Lewis Jr., 79, a retired Navy Captain who was manager of polar operations for the National Science Foundation, died of congestive heart failure Aug. 10 at his home in Thurmont, Md.

Capt. Lewis served in the Navy for 24 years and was assigned to the North Atlantic and Pacific during World War II. He left the Navy after the war and worked as a schooner master, sailing it for the Congregational Church to the South Pacific. He rejoined the Navy in 1950 and returned to the Pacific during the Korean War.

He taught at Columbia University and then commanded an icebreaker in the Arctic and Antarctic. He was assistant for cold weather and hydrographic operations with the Fleet Operations Division and had administrative posts before retiring in 1966.

After that, he helped transfer the U.S. Antartic program from the Defense Department to the National Science Foundation. . A bay in Antarctica was named in his honor.

Survivors include his wife of 48 years, Dorothy Anne Brennan Lewis of Thurmont; six children, and five grandsons. ❑ *(cb Peter Anderson)*

Announcements

Amundsen-Scott South Pole Station 1979-1980 Winter-Over Crew 20-Year Anniversary

Contact:
Mike Savage at mlsavage@clear.net.nz
or
http://members.tripod.com/~AntarcticNet
or
22 Firth Terrace, Karori, New Zealand

American Polar Society 2000 Symposium

The American Polar Society has tentatively scheduled its next symposium for October 2000 at the University of Colorado, Boulder, Co.

Details will be forthcoming in a special announcement in spring 2000.

Check our website for developments

www-nsidc.colorado.edu/aps2000/

Ratheon Corporation Wins Polar Contract Bid

NSF has just announced that Raytheon Systems company has been awarded the National Science Foundation's Antarctic support contract and takes over operations in March. The Program Management Office will be in Denver, CO. Inquiries, call (781) 862 6600.

Letters to the Editor

To the Editor:

Thank you very much for the copy of the *Polar Times*, Spring-Summer 1999.

I had the honor of the first member from Japan of your Society in 1936.

I have enclosed herewith for US $34 for my dues for two years, for as I am now 86 years old, and so I can't understand how many years I can live after this.

I wish a continuation of the *Polar Times* to be published, and its prosperity.

Zenya Taniguchi
Japan

To the Editor:

Even though it has been some years since I have been actively involved in the Antarctic programs, I still find news and information about that extraordinary continent of absorbing interest. The *Polar Times* is quite helpful in keeping my interest in Antarctic matters alive. I hope you will continue your efforts in assembling information on Antarctic programs and events related to them.

Gordon D. Cartwright
San Rafael, CA

To the Editor:

I enjoy the *Times* because it contains so many articles I can't get elsewhere.

Keep on keeping on.

Paulinette Bruni
Houston, TX

To the Editor:

I love the *Polar Times*. It is such an exciting magazine!

Betty Jane Boudreau
Syracuse, NY

To the Editor:

Were delighted to receive our first issue of the *Polar Times* since we became members during our cruise with Captain Apetkhtin on the *Akademik Ioffe*.

You all do a fantastic job, and we look forward to reliving our adventures, as we enjoy the *Polar Times*.

Cynthia and Bill Burmeister
Paris, ME

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SINCE 1934